100mA/50V Digital transistors(with built-in resistors)

DTC023JM / DTC023JEB / DTC023JUB

●Features

1) Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors. (See equivalent circuit)
2) The bias resistors consist of thin-film resistors with complete isolation to allow negative biasing of the input. They also have the advantage of almost completely eliminating parasitic effects.
3) Only the on/off conditions need to be set for operation, making the device design easy.

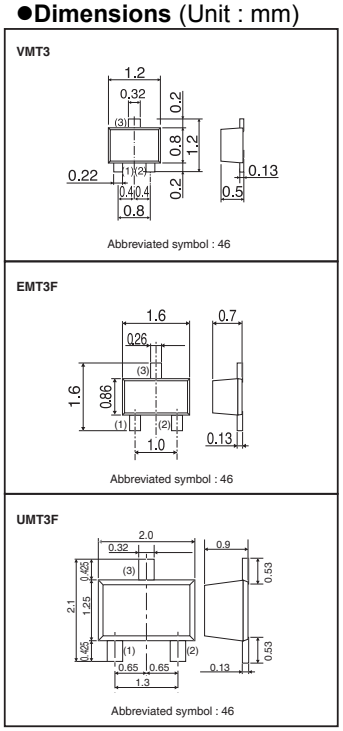
●Structure

NPN epitaxial planar silicon transistor
(Resistor built-in type)

●Applications

Inverter, Interface, Driver

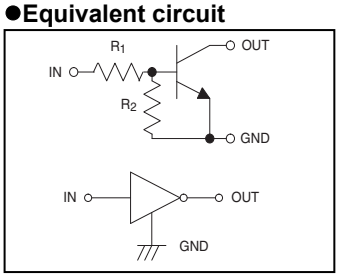
●Dimensions (Unit : mm)



●Packaging specifications and h_{FE}

Type	Package	VMT3	EMT3F	UMT3F
	Packaging Type	Taping	Taping	Taping
	Code	T2L	TL	TL
	Basic ordering unit (pieces)	8000	3000	3000
DTC023JM		○	-	-
DTC023JEB		–	○	-
DTC023JUB		-	-	○

●Equivalent circuit



R_1=2.2kΩ,R_2=47kΩ

●Absolute maximum (Ta=25°C)

Parameter	Symbol	Limits(DTC023J□)			Unit
		M	EB	UB	
Supply voltage	V_{CC}	50			V
Input voltage	V_{IN}	12			V
		-5			V
Collector current *1	$I_{C(max)}$	100			mA
Output current	I_O	100			mA
Power dissipation *2	P_D	150		200	mW
Junction temperature	Tj	150			°C
Range of storage temperature	Tstg	-55 to +150			°C

*1 Characteristics of built-in transistor

*2 Each terminal mounted on a reference land

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●**Electrical characteristics** (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Input voltage	$V_{I(off)}$	-	-	0.5	V	V_{CC}=5V / I_O=100uA
	$V_{I(on)}$	1.1	-	-	V	V_O=0.3V / I_O=5mA
Output voltage	$V_{O(on)}$	-	0.05	0.15	V	I_O=5mA / I_I=0.5mA
Input current	I_I	-	-	3.6	mA	V_I=5V
Output current	$I_{O(off)}$	-	-	500	nA	V_{CC}=50V / V_I=0V
DC current gain	G_I	80	-	-	-	V_O=10V / I_O=5mA
Transition frequency *	f_T	-	250	-	MHz	V_{CE}=10V /I_E=-5mA f=100MHz
Input resistance	R_1	1.54	2.2	2.86	kΩ	
Resistance ratio	R_2/R_1	17	21	26	-	

* Characteristics of built-in transistor

●**Electrical characteristics curves**

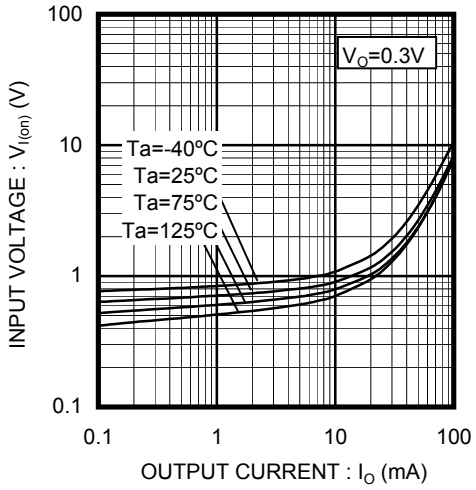

Fig.1 Input Voltage vs. Output Current (ON characteristics)

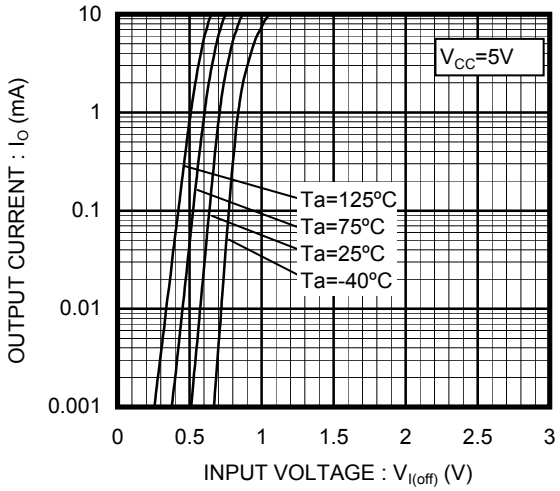

Fig.2 Input Voltage vs. Output Current (OFF characteristics)

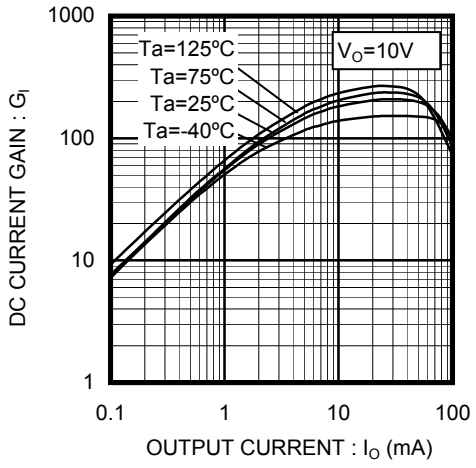

Fig.3 DC Current Gain vs. Output Current

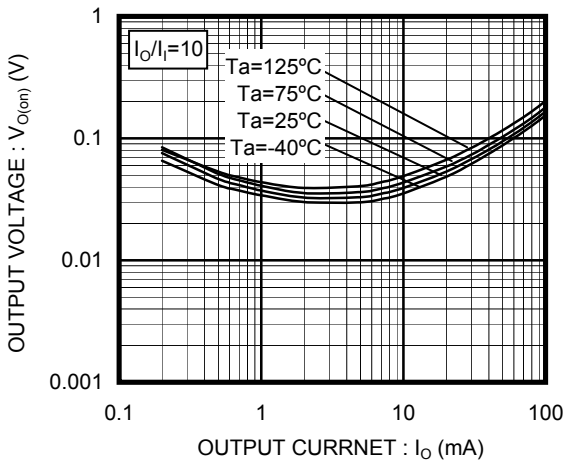

Fig.4 Output Voltage vs. Output Current

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